SD
11
.A9595

United States
Department of
Agriculture

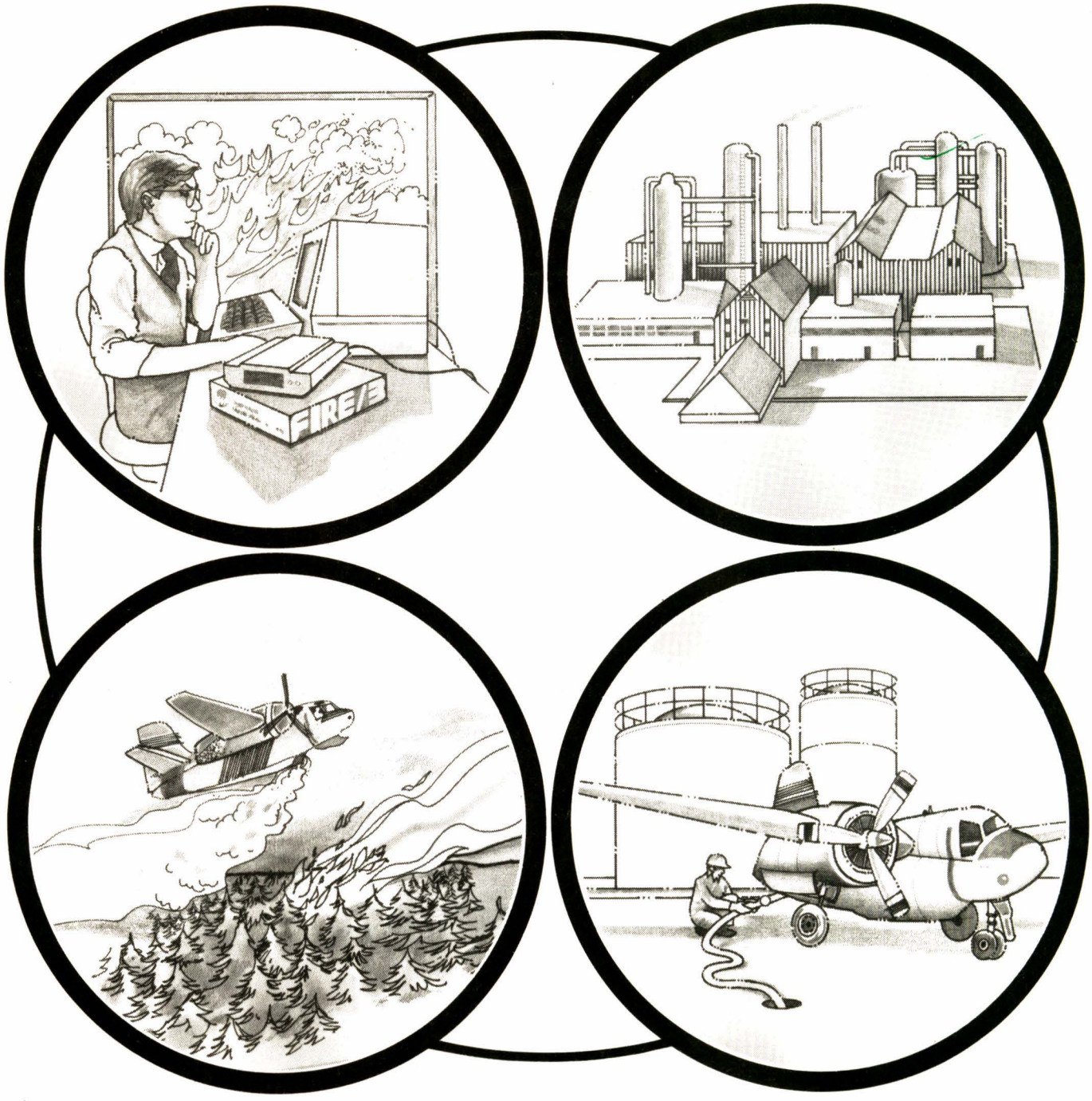
Forest
Service

**Aviation and
Fire Management**

Aerial Retardant Program Improvement Plan

Library 5160

July 1984



LIBRARY FILE COPY
INTERMOUNTAIN STATION
OGDEN, UT.

AERIAL RETARDANT PROGRAM IMPROVEMENT PLAN

Aviation and Fire Management

USDA-Forest Service

1984

Prepared by: John W. Chambers
Assistant Director, A&FM

Recommended by: Jalan Hoffman
Director, A&FM

Recommended by:
Director, FFASR

Approved by: L. Glen Houston
Deputy Chief, NFS
Date: 9/13/84

Approved by: for Bryan Clark
Deputy Chief, Research
Date: 9/19/84

AERIAL RETARDANT PROGRAM IMPROVEMENT PLAN

Table of Contents

		Page
I.	INTRODUCTION	1
II.	AERIAL RETARDANT SYSTEM	1
	A. Retardant	1
	B. Base Location, Construction, and Maintenance	2
	C. Airtankers	3
	D. Aerial Retardant Application and Use	5
	E. Program Administration	6
III.	RESEARCH AND DEVELOPMENT	6
	A. Research	6
	B. Equipment Development and Testing	7
IV.	PROGRAM MANAGEMENT	8
	A. Policy and Direction	8
	B. Program Planning	9
	C. Qualifications and Training	9
	D. Data Management (Records and Reports)	10
	E. Program Monitoring and Evaluation	12
V.	CONCLUSION	12
VI.	SUMMARY OF PLANNED ACTIONS	13

AERIAL RETARDANT PROGRAM IMPROVEMENT PLAN

I. INTRODUCTION

Aerially applied retardants are one of several fire suppression tools available to fire managers. The Forest Service aerial retardant program became operational in the mid-1950's, evolving into a multi-million dollar annual program. The goal of the aerial retardant program is efficient, effective management and use of aerial retardant. The Policy Analysis Staff report, "An Evaluation of Fire Retardant Use", prepared by Bob Gale and Gerald Mauk in 1983, identified several opportunities to improve cost effectiveness, prompting preparation of this plan.

The Aerial Retardant Program Improvement Plan discusses program objectives and opportunities to improve the aerial retardant system, research and development, and program management in general. Specific actions are identified and assigned.

II. AERIAL RETARDANT SYSTEM

The aerial retardant program consists of an integrated system including retardant, retardant bases, airtankers, application and use, program administration, and program management. A discussion of each component follows.

A. Retardant

1. Situation

The Forest Service has been using various fire retardants for many years. Performance criteria and specifications concerning fire retardants were developed in the late 1960's.

Specifications for long-term fire retardants have evolved from Specification 5100-301 in 1969 to Specification 5100-304 in 1982. Specification 304 is scheduled to be implemented in September 1984. Retardant specifications have evolved as fire retardant technology has improved, incorporating the best available scientific information and state-of-the-art technology to increase fire retardant effectiveness.

Several different retardant products are expected to be approved under Specification 304 and be available for use during the 1985 fire season. Some products that have been in use for several years have not yet met Specification 304 due to excessive corrosion levels (refer to Situation Paper on Long-Term Retardant Specification 5100-304 by Roby and Hill dated February 1984 for details).

There is increasing interest in short-term retardants, particularly in Regions 3, 5, and 8. Short-term retardants may well provide a cost effective alternative to long-term retardants in some situations, when used in direct support of ground personnel.

Fire Retardant Value Analysis (sometimes referred to as value engineering) must be conducted at each retardant base prior to selecting retardants to be used. This process allows managers to analyze various retardants and operational alternatives with the objective of identifying the most cost effective qualified/approved retardant and operational mode for the specific base.

A draft revision of the Fire Retardant Value Analysis Guide, dated January 3, 1984, is available from WO-A&FM. The final version is to be available in October 1984.

2. Objectives

- To have an adequate variety of approved retardants available, both short and long-term, to meet fire managers needs in a cost effective manner.

- To develop a competitive retardant market with adequate provision for a fair return to the industry.

- To determine the most appropriate retardant(s) for specific bases through Value Analysis.

3. Action Planned

a. Implement retardant specification 5100-304 (A&FM—FY 84).

b. Evaluate short-term retardants (A&FM/R-5/CDF/R-8--FY 84/85).

c. Conduct Value Analysis (Regions, as required).

B. Base Location, Construction Operation, and Maintenance

1. Situation

Currently the Forest Service is operating, solely or jointly, 37 retardant bases under force account (primary and reload bases). Twelve additional bases are operated under contract. Forest Service facilities typically include buildings for operations personnel, pilots, and storage; taxi ways; parking ramps; retardant mixing, storing, and pumping equipment; and communications equipment. The use of portable retardant facilities is being evaluated in Region 8. The Value Analysis process is helpful in determining which alternative, force account or contract, is most efficient for a particular base.

Airtanker base operation, Service-wide, is estimated to cost over $2 million annually with rapid cost escalation predicted. Airport lease cost is a major variable. Opportunities to reduce escalating costs include long term leases and payment of user fees for landing and take-offs. Air traffic congestion and runway limitations are increasing constraints at many locations. Operating costs between bases vary considerably largely depending upon retardant shipping cost and the volume and type of retardant pumped.

Base location influences the delivery cost of aerial retardants as a function of airtanker flight time. The optimum base location is primarily a function of retardant cost, base investment and operating cost, airtanker delivery cost, volume of retardant pumped and effectiveness of the aerial retardant delivered. Operational programs to assist in determining the most cost-efficient number and location of airtanker bases include NFMAS and DEPLOY TANKER.

2. Objectives

- To determine the most cost-effective number and location of airtanker bases and the role of portable operations in conjunction with our cooperators.

- To achieve adequate, cost-effective base construction and maintenance.
- To operate airtanker bases safely, efficiently and effectively.
- To operate airtanker bases in a manner compatible with other uses and users.

3. Action Planned

- Assess Regional situations and implement actions needed to achieve objectives (Regions—FY 84/85).

C. Airtankers

1. Situation

The Forest Service has contracted for as many as 48 and as few as 41 airtankers in recent years. The total average annual airtanker cost for the period 1978-81 was $9.8 million, of which 39 percent was availability cost and 61 percent was flight cost. The airtanker program trend from 1978-84 is shown in Appendix A.

A Service-wide Airtanker Needs Assessment was conducted in 1983 to determine the number and composition of airtankers needed for the 1984-86 contract period. The Regions identified a need for 34 airtankers (Appendix B). Nationally, it was determined that additional airtankers were needed to assure inter-regional availability through the total mobility concept and to maintain a viable airtanker industry while reducing the program to the most cost efficient level. As a result, contracts for 41 airtankers were awarded for 1984 (Appendix C). The contract fleet will be reduced by two airtankers, one in 1985 and one in 1986.

The Assessment also identified the need to move from both the larger and smaller capacity airtankers toward the medium capacity (2000-2450 gallon) airtankers.

While there are several tools available to assist in determining the most cost-efficient number and type of airtankers for specific purposes, none currently adequately reflect total mobility considerations on a national basis.

Almost all of the current airtanker fleet has tank and gating systems which were designed on technology 15 to 20 years old. The retardant drop tests of the early 1970's and the Experimental Tanking and Gating System (ETAGS) project have demonstrated that more efficient tank and gating systems can be built. Two major obstacles have prevented introduction of these improved delivery systems. First, operators could not remain competitive when bidding on contracts if substantial funds were invested in a better tank which exceeded minimum specifications. Second, the Government's reluctance to pay the increased cost of more expensive systems without a solid, cost-effective analysis on which to base the investment.

There is very little technical information available on the role, capabilities, and use of helicopters in aerial retardant delivery. A current assessment is needed.

Airtanker Contract

The Forest Service has contracted for airtanker services from private industry for more than 20 years. The method of contracting has changed over time with the intent of better meeting Forest Service objectives while maintaining a viable airtanker industry.

The airtanker industry is largely dependent upon Forest Service contracts for its livelihood. The competitive bidding procurement process used during the 1981-83 contract period generated concern, both in industry and in Government, that contract pricing was not reflective of the cost of doing business, particulary during seasons of low use.

A negotiated procurement process is being used in the 1984-1986 contract. As in the prior period, contracts are for one year with option to renew for two additional years. The negotiation process has proven to be a major effort on the part of both industry and the Government, with both beneficial and adverse consequences. It is too early to fully evaluate the process and results at this time, however, constructive, documented critique of each step is needed to facilitate further improvement in the process.

MAFFS

The Modular Airborne FireFighting System (MAFFS) was designed and built for the Forest Service by FMC Corporation to be used in military C-130 aircraft. Eight MAFFS units were delivered in 1974-75. MAFFS is intended to provide airtanker support in extreme emergencies beyond the capability of the contract airtanker fleet.

Air Force Reserve and Air National Guard units provide FS-trained C-130 crews to employ MAFFS when needed, charging only for flight costs. Currently, MAFFS units are located at Van Nuys, California; Cheyenne, Wyoming; and San Antonio, Texas. Current plans are to reassign the San Antonio units to Charlotte, North Carolina.

Forest Service liaison officers have been trained to coordinate military and Forest Service MAFFS operations. A liaison officer is assigned whenever operations are activated. MAFFS units were last activated in the U.S. in 1980.

2. **Objectives**

- o To determine the most cost efficient airtankers, including tank and gating systems, for specific primary bases.

- o To determine the most cost-efficient airtanker fleet size composition and deployment, Service-wide, in conjunction with our cooperators.

- o To utilize the airtanker contract as a vehicle to achieve cost efficient, effective, and safe airtanker operation and the continued viability of the airtanker industry.

3. **Action Planned**

a. Negotiate, award, and administer airtanker contracts for the 1984-86 period (AS).

b. Conduct and document critique of each step of the procurement process and its results (AS/A&FM--FY 84 and continuing).

c. Document and evaluate airtanker performance (COR/CO/A&FM--continuing).

d. Develop a uniform process for determining the most appropriate airtanker type, and tank and gating system, for specific needs (A&FM—FY 85)

e. Conduct Regional and national airtanker needs assessments for the 1987-89 contract period using best available information on airtanker performance (A&FM/Regions—FY 86).

f. Develop an airtanker contract to meet identified needs for the 1987-89 period (A&FM/AS--FY 86).

g. Maintain current MAFFS capability through annual training and system maintenance (A&FM/—FY 84 and continuing).

h. Assess the potential for cost-effective helicopter delivered aerial retardant (A&FM--FY 85).

D. Aerial Retardant Application and Use

1. Situation

Timely, appropriate use is essential for cost-effective aerial retardant application in fire suppression. The primary value of aerial retardant, and the foundation of the airtanker program, is in support of ground personnel during initial attack. It is essential that such use be timely, facilitated through the decisions of qualified personnel and, when necessary, preplanned dispatch.

Aerial retardant can also be a cost-effective tool in large fire suppression in support of overall fire suppression strategies. Opportunities for improved cost effectiveness lie primarily in management decisions to use, discontinue using, or not to use aerial retardant, and the strategy and tactics of application when used. See the Training Section, page 9, for a further discussion of opportunities for improved management through training.

Appropriate air attack organization, aircraft and communications further contribute to the efficiency and effectiveness of the operation. Prudent management and use of leadplanes is a significant consideration. Currently, the Forest Service owns and/or operates 21 aircraft used as leadplanes.

2. Objectives

- To use aerial retardant in a timely, safe, cost-effective manner.
- To have qualified personnel managing aerial retardant use.
- To determine and manage the most cost-effective leadplane fleet in relation to the overall Forest Service aviation program.

3. Action Planned

Determine and implement national and Regional actions to accomplish objectives (A&FM/Regions—FY 84/85).

E. Program Administration

1. Situation

This component of the system includes all of the activities necessary to administer and support the annual program. It includes contract services, retardant base management, maintenance, construction, recurrent program administration, and associated support activities. Planning, programming, and budgeting are essential elements.

2. Objective

- To administer and support the aerial retardant program in a cost-effective manner.

3. Action Planned

Assess Regional situations and implement actions necessary to achieve the objective (Regions—FY 85/86).

III. RESEARCH AND DEVELOPMENT

A. Research

1. Situation

Forest Service Research activities have played an important and continuing role in the evolution of the aerial retardant program. Forest Service retardant use and effectiveness research is conducted at the Northern Forest Fire Laboratory (NFFL) of the Intermountain Station. The annual budget averaged approximately $394,000 for the years 1977-81. The FY 84 research program consists of two scientists and a budget of $145,000.

The most significant research attainments include:

- Airtanker Performance Guides and Retardant Coverage Computers have been developed for 90 percent of the airtanker fleet. These guides and charts assist fire managers in determining the most appropriate airtanker, gating system, retardant, and retardant coverage level for specific suppression situations.

- Improvement of new delivery systems through development of tank design guides. Knowledge of tank design performance parameters and incorporation of relationships into mandatory tank and gating system requirements by the Interagency Airtanker Board.

- Research on retardant formulation priorities (chemical effectiveness, rheology, corrosion, etc.) used by manufacturers, equipment development centers and users in providing information for specifications, quality control, and performance.

- Technical basis for MAFFS.

- Research on drop characteristics, performance, tank and model development, and corrosion.

The effectiveness of aerial retardant application in fire suppression activities has been a continuing concern of both research personnel and fire managers. In response to these concerns, an Aerial Retardant Evaluation Task Force chaired by Dick Cox, Region 8, was established in March 1983 to:

- Evaluate the effectiveness of the operational application of aerial retardant using Airtanker Performance Guides and Retardant Coverage Computers.

- Validate and, if necessary, refine prescribed retardant coverage levels.

The Task Force recommended in May 1983 that airtanker pilots, leadplane pilots, and air attack bosses receive Regional training in the use of the Guides and Computers, and that use of these tools be established as standard operating procedure. In June 1983, A&FM Directors agreed to implement Task Force recommendations. Chuck George and others conducted an operational evaluation of aerial retardant application in Region 5 during the fall of 1983. While limited evaluation opportunity occurred, the evaluation supported operational use of the Guides and Computers. Further evaluation of retardant coverage levels is planned in FY 84 at an estimated cost of $150,000.

2. Objectives

- To reduce or eliminate significant knowledge gaps in aerial retardant system design, application and management.

- To determine the effectiveness of aerial retardant application by fire size and intensity, fuel model, retardant coverage level, and strategy and tactics of use.

- To incorporate knowledge gained through technology transfer.

3. Action Planned

a. Continue to maintain viable aerial retardant research activity in support of program objectives. Identify and prioritize needed research (A&FM/CFP/FFASR—FY 84 and continuing).

b. Continue the operational evaluation of aerial retardant application in FY 84 and beyond as necessary to accomplish defined objectives (NFFL).

c. Develop field guides for the effective application of aerial retardant in specific fuel types and various fire intensities (NFFL--FY 84/85).

B. Equipment Development and Testing

1. Situation

Fire chemicals and mixing, storage and pumping facilities must be evaluated and approved for use by the Forest Service. The Director of Aviation and Fire Management, WO, approves chemicals for operational use by the Forest Service. The National Forest System Liaison Officer (NFSLO) has the responsibility of administering the Fire Chemicals Qualifications and Test Program, and coordinating with the San Dimas Equipment Development Center (SDEDC) and the Northern Forest Fire Laboratory (NFFL) in Missoula.

The "Fire Retardant Value Analysis Guide" was developed by A&FM and SDEDC in 1981 to facilitate determination of the most cost-effective retardant for use at a given base. Forest Service policy requires use of the Value Analysis process. Refinement of the Guide is planned in FY 84.

2. Objective

- To provide managers with a cost-effective fire retardant system to meet their needs.

- To provide chemical manufacturers with specifications and guidelines on retardants to assist in making R&D efforts more efficient and less costly.

3. Actions Planned

a. Determine development and testing needs, prioritize, document, and conduct programs to accomplish objectives (A&FM/CFP/E/Stations—Annually).

b. Refine the Retardant Value Analysis process (A&FM/SDEDC—FY 84).

IV. PROGRAM MANAGEMENT

A. Policy and Direction

1. Situation

Forest Service Manual 5100 establishes policy to provide well planned and well executed fire protection and use programs that are cost-efficient and responsive to land and resource management goals and objectives. Within this overall policy direction, wildfire suppression is to be accomplished at minimum cost consistent with land and resource management objectives and fire management direction. The efficient composition and level of shared resources necessary to carry out this direction is to be accomplished using the National Fire Management Analysis System.

The Fireline Handbook (FSH 5109.17) defines the air attack organization and responsibilities, safety considerations, air traffic control guides, tactical use criteria, and certain airtanker specifications.

The Fixed-wing Operations Handbook (FSH 5709.11) establishes requirements for airtankers and qualifications for airtanker pilots. It also provides planning information for the use of airtankers including gross weights, aircraft dimensions and configuration, speed and fuel consumption, and specific operational characteristics for each type aircraft. FS aviation policy requires adherence to Federal Aviation Regulations except for specific deviations authorized by the Chief. This policy is a cornerstone in the much broader FS aviation directives system incorporated in FSM 5700 and the four handbooks which provide operational direction for the use of airtankers, helicopters, smokejumpers, and in-Service aircraft.

2. Objective

- Provide appropriate, adequate policy and direction to facilitate the accomplishment of aerial retardant program goals and objectives.

3. Planned Action

a. Assure that policy direction in FSM 5100 and 5700 is adequate to achieve the objective (A&FM—FY 84/85).

b. Prepare for the Fireline Handbook, aerial retardant application guides and other material necessary to achieve cost-efficient use of aerial retardant (Aerial Retardant Effectiveness Task Force—FY 84/85).

c. Reaffirm Forest Service policy requiring the planning and implementation of cost-efficient aerial retardant programs and suppression of wildfire at minimum cost (Line Officers/Fire Staffs/Fire Overhead—FY 84 and continuing).

B. Program Planning

1. Situation

Forest Service policy requires that the cost-efficient composition and level of shared resources be determined by the responsible administrative unit. This responsibility is shared by the national office and Regional offices in the case of airtankers. Regions are responsible for assessing and determining their needs in concert with affected Regions and partner agencies. The national office is responsible for assessing and determining the national program.

Analytical tools for accomplishing this task include DEPLOY TANKER and the NFMAS IAA model. These tools were used to varying degrees in the 1983 Airtanker Needs Assessment. There is a need to refine the NFMAS process to more readily facilitate analysis of shared resources. Specific cost and performance information resulting from negotiated airtanker contracts will facilitate closer tailoring of airtanker type, tank, and gating system to primary base location, thus improving cost effectiveness.

2. Objective

- To provide improved capability to determine the most cost efficient aerial retardant program at the Forest, Region, and national level.

3. Action Planned

Improve the National Fire Management Analysis System (NFMAS) to provide the ability to evaluate the effectiveness/efficiency of alternative airtanker numbers and locations on an inter-Forest and Region-wide basis. (A&FM—FY 84)

C. Qualifications and Training

1. Situation

Cost-effective aerial retardant program administration is dependent upon the actions of qualified personnel. The National Interagency Fire Qualifications System (NIFQS) and the emerging National Interagency Incident Management System (NIIMS) qualification system define criteria for fire suppression personnel.

The Aerial Retardant Effectiveness Task Force is currently amending courses S-370, Intermediate Air Operations, and S-470, Air Attack Boss, to include training in the use of Air Tanker Performance Guides and Retardant Coverage Computers. Video tapes of actual aerial retardant application are also being made to further improve training effectiveness.

Associated training of initial attack personnel and fire overhead is needed in the strategy and tactics of aerial retardant application, the retardant coverage level concept, and the costs, capabilities, and limitations of aerial retardants in fire suppression activities.

Training for Regional airtanker contract COR's was conducted in the spring of FY 84 to assure appropriate, consistent administration of the contract. WO, Regional, and Forest fire program managers also need to have a working knowledge of the contract. Retardant base managers and mixmasters must be thoroughly trained in base operation, contract administration, and the keeping of associated records and reports.

2. Objective

- Provide appropriate training for all personnel involved in the aerial retardant program to effectively and efficiently accomplish their responsibilities.

3. Action Planned

a. Train airtanker pilots, Airtanker Coordinators, and Air Attack Bosses in the use of Airtanker Performance Guides and Retardant Coverage Computers (Regions—FY 84 and continuing).

b. Incorporate the use of Guides and Computers in S-370 and S-470 (Aerial Retardant Effectiveness Task Force--FY 84).

c. Provide an appropriate level of training in the efficient and effective use of aerial retardants to initial attack personnel and fire overhead (WO/Regions/Forests--FY 84 and continuing).

d. Conduct training in administration of airtanker contracts for Regional COR's (Contracting Officer—FY 84 and continuing).

e. Conduct airtanker contract orientation training for all Air Tanker Bosses, Air Attack Bosses, fire program managers, and retardant base managers (Regions—FY 84 and continuing).

D. Data Management (Records and Reports)

1. Situation

Currently there are several reports made at various organizational levels concerning various components of the system. It is difficult to aggregate information and the reliability of such information is questionable.

a. Retardants

Fire retardants for the most part are obtained through the General Services Administration (GSA) by a negotiated contract with each manufacturer for approved products. A small percentage of fire retardant

is provided through local contracts with manufacturers and contractors where retardant mixing, pumping and delivery to the airtanker is provided on the basis of gallons delivered to the aircraft.

Retardant use in gallons is reported annually on Aircraft Use Report Form, 5700-10.

b. Base Operation and Quality Control

To assure managers that the mixed retardant being delivered to fires is meeting Forest Service specifications, a field quality control program has been implemented ("Field Quality Control of Fire Retardant Chemicals", NWCG, 1981). In addition, a guide has been developed to assist the base manager in determining whether or not retardant products delivered to a base contain the proper components in the proportions tested and qualified ("Lot Acceptance and Quality Assurance Procedures", San Dimas Equipment Development Center). This procedure is conducted when lots (usually 20 to 25 tons) of retardant are delivered to a base. The lot can be rejected if it does not meet approved formulation and appropriate compensation made to the Government.

c. Airtanker Records and Reports

- Pilot and Aircraft approvals
- Flight Use Reports, 6500-122
- ACUSE Data Base (FCCC)
- Cumulative Aircraft Use/Payment Summary, 6300-49
- COR Daily Diaries and Contracting Officers files
- Annual Airtanker Summary (AS)
- Airtanker Statistical Compilation (A&FM)

d. Leadplane and Air Attack Aircraft Records

- WCF cumulative cost/income records
- Flight Use Reports, 6500-122
- Cumulative Aircraft Use/Payment Summary, 6300-49
- ACUSE Data Base (FCCC)

e. Fire Management Reports of Airtanker Use and Performance

- Individual Fire Report, 5100-29 (Ranger District)
- Incident Status Summary, 5100-11 (Forest)
- Aerial Retardant Effectiveness Evaluation Form

2. Objective

- To define, collect, process, store, and retrieve data necessary for efficient, effective program administration and management.

3. Planned Action

a. Review reports and reporting procedures, revise as necessary (A&FM—FY 84 and 85).

b. Develop and implement a standardized aircraft use reporting system (A&FM—FY 84).

E. Program Monitoring and Evaluation

1. Situation

a. Effectiveness of Retardant Application

There is no formal process for evaluating the operational effectiveness of aerial retardant. Fire managers have largely learned how to use aerial retardant through trial and error. The operational evaluation being conducted in Region 5 by NFFL is intended to provide a more technical evaluation.

The Aerial Retardant Effectiveness Task Force has developed an aerial retardant effectiveness evaluation form for operational use by fire managers and overhead. The purpose of this form is to provide a vehicle for subjectively evaluating and recording the effectiveness of aerial retardant application on any fire as a means to improve the management and use of aerial retardant.

The records and reports listed in the preceding section also provide useful information at the Regional and national levels for program monitoring and evaluation.

2. Objective

- To collect, evaluate and use appropriate information to improve the aerial retardant program.

3. Planned Action

a. Utilize the Aerial Retardant Effectiveness Evaluation Form (Fire overhead and managers--FY 84 and continuing).

b. Utilize airtanker cost, performance, and use data in determining the desired type, composition and placement of airtankers (WO/Regions).

c. Evaluate leadplane mission, requirements, and procurement options as a part of leadplane replacement planning (A&FM).

V. CONCLUSION

The objectives and actions identified in this plan recognize and provide for management of the aerial retardant program as an integrated system. When supplemented by Regional plans and actions implemented it will facilitate Service-wide improvement of the aerial retardant program.

VI. SUMMARY OF PLANNED ACTIONS

II. AERIAL RETARDANT SYSTEM

A. Retardant

a. Implement retardant specification 5100-304 (A&FM--FY 84).

b. Evaluate short-term retardants (A&FM/R-5/CDF/R-8--FY 84).

c. Conduct Value Analysis (Regions, as required).

B. Base Location, Construction Operation, and Maintenance

o Assess Regional situations and implement actions needed to achieve objectives (Regions--FY 84/85).

C. Airtankers

a. Negotiate, award, and administer airtanker contracts for the 1984-86 period (AS).

b. Conduct and document critique of each step of the procurement process and its results (AS/A&FM - FY '84 and continuing).

c. Document and evaluate airtanker performance (COR/CO/A&FM--continuing).

d. Develop a uniform process for determining the most appropriate airtanker type, and tank and gating system, for specific needs (A&FM--FY 85).

e. Conduct Regional and national airtanker needs assessments for the 1987-89 contract period using best available information on airtanker performance (A&FM/WO/Regions--FY 86).

f. Develop an airtanker contract to meet identified needs for the 1987-89 period (A&FM/AS--FY 86).

g. Maintain current MAFFS capability through annual training and system maintenance (A&FM/WO--FY 84 and continuing).

h. Assess the potential for cost-effective helicopter delivered aerial retardant (A&FM--FY 85).

D. Aerial Retardant Application and Use

o Determine and implement national and Regional actions to accomplish objectives (A&FM/WO/Regions--FY 84/85).

E. Program Administration

o Assess Regional situations and implement actions necessary to achieve the objective (Regions--FY 85/86).

III. RESEARCH AND DEVELOPMENT

A. Research

a. Continue to maintain viable aerial retardant research activity in support of program objectives. Identify and prioritize needed research. (A&FM/CFP/FFASR--FY 84 and continuing.)

b. Continue the operational evaluation of aerial retardant application in FY 84 and beyond as necessary to accomplish defined objectives (NFFL).

c. Develop field guides for the effective application of aerial retardant in specific fuel types and various fire intensities (NFFL—FY 84/85).

B. Equipment Development and Testing

a. Determine development and testing needs, prioritize, document, and conduct programs to accomplish objectives (A&FM/CFP/E/Stations—Annually).

b. Refine the Retardant Value Analysis process (A&FM/SDEDC—FY 84).

IV. PROGRAM MANAGEMENT

A. Policy and Direction

a. Assure that policy direction in FSM 5100 and 5700 is adequate to achieve the objective (A&FM—FY 84/85).

b. Prepare for the Fireline Handbook, aerial retardant application guides and other material necessary to achieve cost-efficient use of aerial retardant (Aerial Retardant Effectiveness Task Force--FY 84/85).

c. Reaffirm Forest Service policy requiring the planning and implementation of cost-efficient aerial retardant programs and suppression of wildfire at minimum cost (Line Officers/Fire Staffs/Fire Overhead—FY 84 and continuing).

B. Program Planning

- Improve the National Fire Management Analysis System (NFMAS) to provide the ability to evaluate the effectiveness/efficiency of alternative airtanker numbers and locations on an inter-Forest and Region-wide basis (A&FM—FY 84).

C. Qualifications and Training

a. Train airtanker pilots, Airtanker Coordinators, and Air Attack Bosses in the use of Airtanker Performance Guides and Retardant Coverage Computers (Regions—FY 84 and continuing).

b. Incorporate the use of Guides and Computers in S-370 and S-470 (Aerial Retardant Effectiveness Task Force--FY 84).

c. Provide an appropriate level of training in the efficient and effective use of aerial retardants to initial attack personnel and fire overhead (WO/Regions/Forests—FY 84 and continuing).

d. Conduct training in administration of the 1984 airtanker contracts for Regional COR's (Contracting Officer—FY 84 and continuing).

e. Conduct airtanker contract orientation training for all Air Tanker Bosses, Air Attack Bosses, fire program managers, and retardant base managers (Regions—FY 84 and continuing).

D. Data Management (Records and Reports)

a. Review reports and reporting procedures, revise as necessary (A&FM—FY 84 and 85).

b. Develop and implement a standardized aircraft use reporting system (A&FM—FY 84).

E. Program Monitoring and Evaluation

a. Utilize the Aerial Retardant Effectiveness Evaluation Form (Fire Overhead and Managers—FY 84 and continuing).

b. Utilize airtanker cost, performance, and use data in determining the desired type, composition and placement of airtankers (WO/Regions).

c. Evaluate leadplane mission, requirements, and procurement options as a part of leadplane replacement planning (A&FM).

Appendix A

AIRTANKER PROGRAM TREND, 1978 - 1984

(Airtanker by size class in gallons)

Year	Mand. Avail. Days*	900	1050	1200	1800	2000	2200	2300	2450	2800	3000	total
1978	4981	1		4	9	16		3	14		1	48
1979	4732		2	3	5	17	1	2	17		1	48
1980	4662		2	4	4	16	1	2	17		1	47
1981	4472		1	4	1	17	1		12		7	43
1982	4407		1	4	1	17	1		12		7	43
1983	4714		1	4	1	17	1		12		7	43
1984	4473			2		17	1		12	3	6	41

* Excludes State of Idaho and Minnesota contract items.

AIRTANKER FLIGHT HOURS AND COST

Year	Pre-Season	Mand. Period	Post-Season	Total Hours	Cost $
1978	11	3,019	141	3,171	2,510,183
1979	173	5,593	536	6,302	5,558,706
1980	65	4,641	1,155	5,861	5,831,179
1981	146	4,650	272	5,068	7,061,788
1982	0	2,295	22	2,317	3,219,823
1983				2,456	3,773,094

AIRTANKER AVAILABILITY COSTS

Year	Mand. Avail.	Total Avail. Incl. Pre/Post
1978	$3,250,203	$3,374,836
1979	$2,719,946	$2,924,795
1980	$2,730,809	$3,052,369
1981	$3,408,567	$3,565,226
1982	$3,872,017	$3,906,711
1983	$3,702,000	$3,904,372
1984	$4,781,000	

Appendix B.

REGIONAL 1984-86 AIR TANKER NEEDS ASSESSMENT
(By Date Including Prearranged Combined Contracts)

BASE	DATES	BASE	DATES	BASE	DATES	BASE	DATES	GALLONS
Ft. Smith	2/19-4/20	Silver City	4/21-7/11	Coeur d'Alene	7/12-9/14			2000
Ft. Smith	2/19-4/20	Silver City	4/21-7/30					2000
Tri Cities	3/1-5/10	Albuquerque	5/11-7/14	Kalispell	7/15-9/15			2450
Ashville	3/1-5/1	Alamagordo	5/2-6/15	Libby	6/16-7/10	McCall	7/11-9/20	2000
Knoxville	3/1-5/16	Albuquerque	5/17-7/9	Missoula	7/10-9/15			2450
Alamagordo	4/6-7/14	Boise	7/15-9/30					2450
Hibbing	4/15-5/31							2000
Hibbing	4/15-5/31							1200
Grand Canyon	5/1-7/30							3000
Ramona	5/1-11/30							2000
Prescott	5/3-8/4							2000
Winslow	5/4-7/12	W. Yellowstone	7/13-9/5					2450
Coolidge	5/9-8/15							2450
Winslow	5/15-7/15	Chester	7/16-9/30					2000
Hemet	5/18-11/17							2000
Fresno	5/23-10/31							3000
Klamath Falls	5/26-9/29							2800
Wenatchee	5/27-9/30							2450
Coolidge	5/28-8/31							2450
Paso Robles	6/1-11/15							2000
Porterville	6/2-10/24							2000
Fox Field	6/3-4/30							2000
Jeffco	6/3-9/15							2200
Redding	6/10-10/13							2000
Medford	6/10-10/2							2800
Hemet	6/15-11/17							2000
Redmond	6/16-10/8							2800
Wenatchee	6/17-10/9							2450
LaGrande	6/29-10/21							2000
Salt Lake City	7/1-9/30							2450
Fox Field	7/1-11/30							2000
Redmond	7/1-10/23							2800
Goleta	7/1-10/15							2000
Chico	7/2-10/15							2000

Appendix C.

1984 AIR TANKER CONTRACT

BASE	DATES	BASE	DATES	BASE	DATES	GALLONS	REMARKS
Tri-Cities	3/2-5/10	Albuquerque	5/17-7/9			2450	P2V
Knoxville	3/3-5/16	Missoula	7/10-9/15			2450	P2V
Ft. Smith	3/3-4/20	Silver City	4/21-7/30			2000	DC-4
Ashville	3/3-5/1	Alamogordo	5/2-6/15	Cedar City	7/1-8/29	2000	DC-4
Ft. Smith	3/4-4/20	Silver City	4/21-7/11	Coeur d-Alene	7/12-9/14	2000	DC-4
Sanford	3/15-5/15	Marana	5/16-7/12			2000	DC-6 Basic
Alamogordo	4/6-7/14	Boise	7/15-9/30			2450	P2V
Ely	4/15-5/30	Missoula	7/1-9/15			1200	B-26S
Ramona	5/1-11/30					2000	DC-4
Prescott	5/3-8/4					2450	P2V
Winslow	5/4-7/12	W. Yellowstone	7/13-9/5			2450	P2V
Coolidge	5/9-8/15					2450	P2V
Grand Canyon	5/10-8/8					3000	DC-7
Albuquerque	5/11-7/14	Kalispell	7/15-9/15			2450	P2V
Winslow	5/15-7/15	Chester	7/16-9/30			2000	PB4Y2
Hemet	5/18-11/17					2000	DC-4
Fresno	5/23-10/31					3000	DC-7
Klamath Falls	5/26-9/29					2800	DC-6B
Wenatchee	5/27-9/30					2450	DC-6B
Coolidge	5/28-7/31					2450	P2V
Paso Robles	6/1-11/15					2000	DC-4
Porterville	6/2-10/24					2000	DC-4
Fox Field	6/3-11/30					2000	DC-4
Jeffco	6/4-9/16					2200	PB4Y2
Redding	6/10-10/13					2000	DC-4
Medford	6/10-10/2					3000	DC-6B
Hemet	6/15-11/17					2000	DC-4
Santa Barbara	6/15-11/15					2000	C-123K
Redmond	6/16-10/8					2800	DC-7
Ft. Huachuca	6/16-7/10	McCall	7/11-9/20			2000	PB4Y2
Wenatchee	6/17-10/9					2450	DC-6B
LaGrande	6/29-10/21					2000	DC-6 Basic
Klamath Falls	7/1-9/30					3000	DC-6B
Redmond	7/1-9/30					2800	DC-7
Boise	7/1-9/30					3000	DC-7
LaGrande	7/1-9/30					2450	P2V
Salt Lake City	7/1-9/30					2450	P2V
Fox Field	7/1-9/30					3000	DC-7
Fox Field	7/1-11/15					2000	DC-4
Chico	7/2-10/15					2000	DC-6 Basic
Hibbing	4/15-5/31					1200	B-26S